Full Head Block for headache treatment: technical description, indications and mechanisms

Bloqueio completo da cabeça no tratamento das cefaleias: Descrição técnica, indicações e mecanismos

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ABSTRACT

Headache is a most prevalent neurological condition in the world and has a major impact on quality of life. The causes are usually multifactorial and may have a chronic character. Headache management involves pharmacological and non-pharmacological approach; invasive and noninvasive. Peripheral nerve block is already a viable, safe, and effective treatment option, such as major occipital nerve block. Full head block is a minimally invasive proposal of peripheral pain neuromodulation for the treatment of refractory or severe headache, mainly. The aim of this paper is to describe a technique and discuss the role of full head block in the headache management. The proposal is bilaterally anesthetizing the following nerves: major and minor occipital, supraorbital, supratrochlear, zygomatic-temporal and auriculo-temporal with local anesthetic and a corticosteroid. Many aspects should be studied: efficacy and safety of the technique, clinical indications, professional training, need for USG guidance, adequate dose of anesthetic and corticosteroids. In order to further evaluate the role of peripheral blocks in headaches randomized controlled trials are required.

Keywords: Nerve blocks; Occipital nerve; Auriculotemporal nerve; Supraorbital nerve; Supratrochlear nerve; Zygomatic nerve; Primary headache

RESUMO

Cefaleias primárias são condições neurológicas prevalentes no mundo com grande impacto na qualidade de vida. As causas são geralmente multifatoriais e podem ter caráter crônico. O gerenciamento da dor de cabeça envolve abordagem farmacológica e não farmacológica; invasivo e não invasivo. O bloqueio do nervo periférico já é uma opção viável, segura e eficaz de tratamento, como o bloqueio do nervo occipital maior. O bloqueio cefálico completo é uma proposta minimamente invasiva da neuromodulação da dor periférica, principalmente para o tratamento de cefaleias refratárias ou intensas. O objetivo deste artigo é descrever uma técnica e discutir o papel do bloqueio cefálico completo no manejo das cefaleias. A proposta é uma anestesia local bilateraldos seguintes nervos: occipital maior e menor, supraorbital, supratroclear, zigomático-temporal e aurículo-temporal com anestésico local associado a corticoide. Muitos aspectos devem ser estudados: eficácia e segurança da técnica, indicações clínicas, treinamento profissional, necessidade de orientação por ultrassonografia, dose adequada de anestésico e corticosteróide. Para melhor avaliação do papel dos procedimentos periféricos nas cefaleias, ensaios clínicos randomizados e robustos são necessários.

Descritores: Bloqueios nervosos; Nervo occipital; Nervo auriculotemporal; Nervo supraorbital; Nervo supratroclear; Nervo zigomático; Cefaleias

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INTRODUCTION

Headache is the most prevalent neurologic condition in the world[1]. It most affects patient in productive age and is associated with a substantial personal and societal burden. Migraine represents the first highest cause of disability under 50 years of age and the second worldwide[2]. Migraine, the most common primary headache, has been found in 15,2% in Brazil[3], followed by tension-type headache (13%)[4] and chronic headaches (6,9%)[5]. They are frequently multifactorial and have a chronic character. Its treatment can be challenging and involves pharmacological and non-pharmacological, invasive and non-invasive approaches, as well as acute and prophylactic therapy[6].

There are now several non-invasive and invasive options to manage headache. Peripheral nerve block is a minimally invasive therapy and represents an excellent alternative to conventional drugs (responsible for a wide range of side effects due to its action on several neurotransmitters) and to non-pharmalogical neuromodulation, like Transcranial Magnetic Stimulation (TMS) and Transcranial Direct Current Stimulation (tDCS)[7]. The nerve block can be used in primary (migraine, cluster headache, and nummular headache) and secondary headaches (cervicogenic headache and headache attributed to craniotomy), as well in cranial neuralgias (trigeminal neuropathies, glossopharyngeal and occipital neuralgias)[8]. Nerve block provides rapid pain relief to patients and its analgesic effect often long-lasting (sometimes for weeks to months). The mechanism includes an interruption of neural conduction in peripheral nerves and nerve trunks by the injection of a local anesthetic agent (e.g., lidocaine, bupivacaine). However, it is still incomplete understood, but is likely secondary to effects on central pain modulation via second order neurons in the trigeminocervical complex[9].

Several peripheral cranial nerve targets have been aimed in this approach. Greater occipital nerve is the most studied peripheral nerve block, but there are some others sites already tested, such as lesser occipital nerve, supratrochlear nerve, supraorbital nerve and auriculotemporal[10]. The procedure is fast, easy, generally safe and well tolerated, becoming attractive for clinicians and patients, especially for resistant headaches.

A similar procedure has been done in neurosurgical anesthesia where all peripheral nerves are blocked to anesthetize the scalp, the so-called scalp block[11]. Scalp block involves regional anesthesia to the nerves that innervate the scalp, providing analgesia for tumor excision, epilepsy surgery and deep brain stimulation surgery[12]. Full head block is different from scalp block because of its therapeutic target and technique.

Our study aimed to describe the technique and discuss the role of a full head block in headache management treatment.

METHODS

The proposal of full head nerve block is to anesthetize bilaterally greater lesser and third occipital, supraorbital, supratrochlear, zygomatic-temporal and auriculotemporal nerves. The techniques of each nerve block are detailed below.

Greater occipital nerve (GON) block.

GON is located approximately two thirds of the distance on a line drawn from the center of the mastoid to the external occipital protuberance. GON can also be located palpating occipital artery; because of that, care needs to be taken to avoid intra-arterial injection. Another option is to inject approximately 2 cm lateral to the external occipital protuberance[13].

Lesser occipital nerve (LON) block.

LON is located approximately one third of the way on a line drawn from the center of the mastoid to the greater occipital protuberance[14].

Third occipital nerve (TON) block.

TON is located deep to the semispinalis capitis muscle and two anatomic landmarks are used: the tip of the mastoid process and the C3 spinous process[14]. The

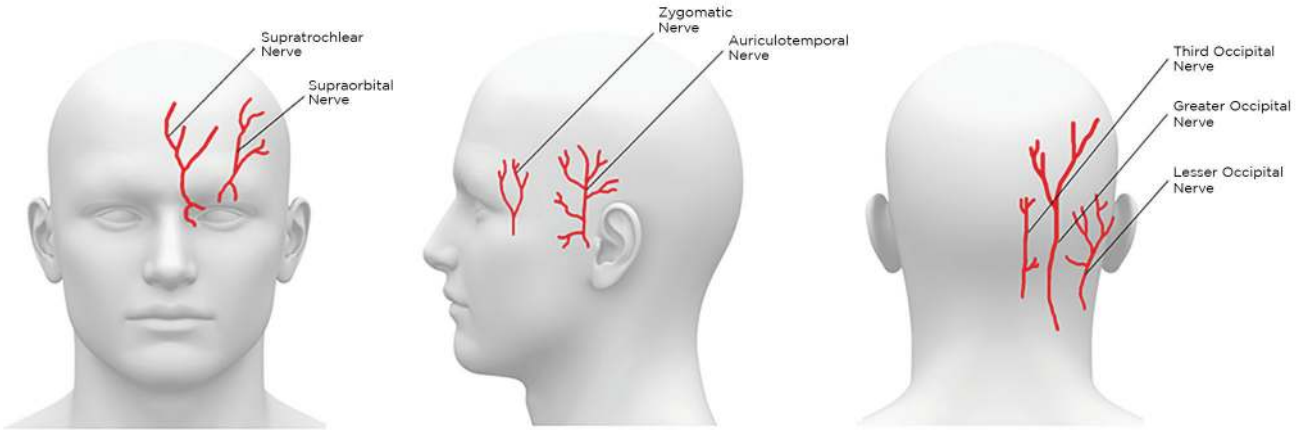

Figure 1. Topography of the nerve's blockage in full head block propose

third occipital nerve lies medial to great occipital nerve and have fibers communication between both, and is blocked in the same injection of GON by the intimacy proximity.

Auriculotemporal nerve (ATN) block

ATN is located at superior to the posterior portion of the zygomatic bone just anterior to the ear. It follows superficial temporal artery that can be palpated and used as a reference for the block[14].

Supraorbital nerve (SON) block

SON, which runs approximately 2 cm lateral to the supratrochlear nerve, the injection can be done in this point, or the needle can be advanced laterally through the same puncture that was used for the STN[13,14].

Supratrochlear nerve (STN) block

STN is blocked by inserting the needle just above the eyebrow over its medial border[13,14].

Zygomatic nerve (ZN) block

ZN is blocked by placing the index finger on ventral rim of the orbit at the lateral canthus of the eye, and firmly press against the supraorbital portion of the zygomatic arch[12,14].

POSSIBLE INDICATIONS

Full head block can be performed together with botulinum toxin, as a bridge therapy, while waiting to the toxin starting to work[15-17]. Refractory headache, primary headache in pregnancy and the presence of contraindications for other treatment's options.

Peripheral nerve block has already been tested for primary headache disorders like migraine prevention, migraine acute treatment, cluster, neuralgia and tension-type, as well as to secondary headache disorders such posttraumatic headache, post-surgical headache and scar related pain. It can also be considered as a transitional treatment in chronic headaches.

LIMITATIONS

The major side effects occur due to local injection. There are related cases of local infection, nerve damage with later neuroma formation, hematoma, local injury to adjacent structures and, rarely, systemic manifestations due to absorption of local anesthetics (seizure, alteration in consciousness and cardiac conduction effects when high doses are used). Using small needles and aiming for perineural sites are helpful in avoiding these side effects. When patient has anatomic abnormalities, such as skull defects, local infection or previous surgical scars, the procedure is not indicated.

Assistant's training about the location of structures, technique and aseptic environment is necessary for a great performance of the procedure. Studies must be designed to identify the efficient amount of local anesthetic, necessity of ultrasound guided[18] and addition of corticosteroid (methylprednisolone or betamethasone).

FUTURE DIRECTIONS

Thereby, clinical trials are important to assess the role of the full head block for headache treatment. It represents the combination of several well tolerated and effective therapy, with a lack of side effects.

DISCUSSION

There are many examples of peripheral targeted treatments, such as low-level laser therapy, topical lidocaine, dry needling, electrical stimulation and massaging[19]. There are other forms of inducing anesthesia with nerve blocks, e.g., lidocaine transdermal patch[20].

It has already been discussed through literature about the role of peripheral nerve block on headache management[21,22]. Peripheral nerve block can result in rapid relief of pain and allodynia, reduce the number of headache days and medication consumption[23] and its effects may last for several weeks. Thereby, nerve block is a viable and safe treatment option for selected groups of headache patients, particularly those with intractable headache.

Although there are many studies about effectiveness of a specific nerve block[24-26], especially greater occipital nerve block[27], there is no case report that apply full head block for treatment of primary headache. Why should we do a full head block? Due to: (1) distribution nerve pain - headaches are not limited to one nerve; (2) necessity of a complete peripheral detachment to arouse neuromodulation; (3) acute response in headache attack; and (4) refractory headaches to others procedures.

CONCLUSION

Considering this rational, structured scientific evidence with blinded and sham-controlled studies is needed to understand the action mechanism, validate doses of the anesthetics, train professionals and establish the efficacy of full nerve block in headache disorders.

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